

Dr. Paul Metcalfe

Director, PJM Economics

Address: 1 Walford Close, Wimborne, Dorset, BH21 1PH

Tel: +44 1202 831316

Email: paul@pjmeconomics.co.uk



OVERVIEW

Paul Metcalfe is an experienced economist and project leader specialising in stated preference and revealed preference research, economic regulation, cost-benefit and cost-effectiveness appraisal, survey design and analysis, and applied econometrics. He has advised clients in water, transport, energy, environment, health, post, telecoms, financial services and local government sectors. Prior to founding PJM economics, Paul worked at NERA Economic Consulting and the Centre for Market and Public Organisation.

EDUCATION

2007 – 2012	PhD in Environmental Economics London School of Economics and Political Science, UK
2006 – 2007	MSc in Human Geography Research London School of Economics and Political Science, UK
2000 – 2001	MSc in Economics University of York, UK
1995 – 1998	BSc in Economics University of Bristol, UK

PROFESSIONAL EXPERIENCE

02/2012 – present	Director, PJM Economics, (Dorset, UK)
01/2010 – present	Visiting Lecturer, then Honorary Lecturer, Dept of Economics, City University, (London, UK)
04/2008 – 02/2012	Independent Consultant, (London, UK)
08/2002 – 03/2008	Consultant, NERA Economic Consulting (London, UK)
01/2002 – 08/2002	Project Consultant, Norwich Union, (York, UK)
09/1998 – 08/2000	Research Assistant, CMPO, University of Bristol, (Bristol, UK)

MEMBERSHIPS

Royal Economic Society, European Association of Environmental and Resource Economists, Chartered Institute of Water and Environmental Management, UK Network of Environmental Economists, Market Research Society.

SELECTED PUBLICATIONS

Anciaes, P., Metcalfe, P. and Heywood, C. (2017) Social impacts of road traffic: perceptions and priorities of local residents, *Impact Assessment and Project Appraisal*, 35(2), 172-183.

Metcalfe, P. and Baker, W. (2015) The Sensitivity of Willingness to Pay to an Economic Downturn, *Journal of Environmental Economics and Policy*,4(1).

Metcalfe, P. et al. (2012) An Assessment of the Nonmarket Benefits of the Water Framework Directive to Households in England and Wales, *Water Resources Research*, 48. (Recipient of Editor's Choice Award for 2012.)

Metcalfe, P. and Baker, W. (2012) Willingness to Pay to Avoid Drought Water Use Restrictions, Working Paper.

NERA and Accent (2011) Carrying Out Willingness to Pay Surveys, UKWIR Report Ref. No. 11/RG/07/22.

NERA and Accent (2009) The Social Value of the Post Office Network, Report to Postcomm, UK.

NERA and Accent (2008) CRP Project 4d: Public Preferences for WFD Outcomes [Prioritisation], Final Report for DEFRA, UK.

NERA and Accent (2007) The Benefits of Water Framework Directive Programmes of Measures in England and Wales, A Final Report to DEFRA re CRP Project 4b/c, UK.

Baker, W. and Metcalfe, P. (2007) Estimating Customers' Willingness To Pay For Service Quality: The Example Of Water Service Reliability In London, in Voll, S.P. and M.J.King (eds) *The Line in the Sand: The Shifting Boundary Between Markets and Regulation in Network Industries*.

Asteriou, D., Cubbin, J., Jones, I., Metcalfe, P., Paredes, D. & Van der Veer, J (2005) *The Demand for Long Distance Travel in Great Britain: Some New Evidence* (Report No. 05/01). London, UK: Department of Economics, City University London, UK.

NERA (2004) Review of Seasonal Adjustments, A Report for Office of the Deputy Prime Minister, UK.

NERA (2004) Estimating Opex and Capex Efficiency, A Report for Water UK.

NERA (2003) Research on Long-Term Fare Elasticities, A Report for the Strategic Rail Authority, UK.

NERA (2003) A Framework Methodology for Estimating the Impact of Household Metering on Consumption, UK Water Industry Research, Report Ref. No. 03/WR/01/4.

NERA (2003) UK Water Cost of Capital, A Report for Water UK.

PROJECTS

Anglian Water, UK

Customer Engagement Forum Member

Currently serving as a member on Anglian Water's independent forum appointed to challenge and report on the quality and depth of customer engagement undertaken by the company and the extent to which this has driven decision making in relation to its PR19 business plan.

Economic Bank for Reconstruction and Development, UK

Western Balkans Migration Study

Currently leading the design and analysis components of a stated preference research study to explore the drivers of migration from residents of Albania and Kosovo into Western Europe. The results are to be used to appraise development policies in the region in relation to their impact on migration.

South Staffordshire Water, UK

Peer Review of Stated Preference Valuation Research

Reviewed two studies which sought to obtain valuations of water service improvements in relation to PR19 business planning.

A Club of 14 Water Companies, UK

Comparative Review of PR19 Willingness to Pay Results

Produced a report comparing willingness to pay results from across the water industry for PR19.

South Staffordshire Water and Southern Water, UK

Triangulation of Evidence for PR19

Conducted studies for two water companies involving the assembly and comparative analysis of valuation evidence in relation to water and wastewater service improvements for PR19 business planning.

Kenya Railways, Kenya

Nairobi Commuter Rail Stated Preference Research

Led the design, analysis and reporting components of a stated preference research study exploring the value of travel time savings amongst car users, the potential demand for new public transport modes in Nairobi.

Southern Water, UK

Shellfish Waters Valuation Research

Led a study to derive valuations from published literature for improvements in water discharges affecting shellfish waters in the Southern Water supply area. Results were important for PR19 business planning.

WPD and UKPN, UK**Stated Preference Valuation of Energy Service Attributes**

Led the design, analysis and reporting components of a stated preference project for two UK energy companies. The study was focussed on obtaining measures of customer willingness to pay for various service attributes for use within business plans.

National Grid, UK**Business Plan Acceptability Research**

Advised on the design, analysis and reporting components of a survey project to test customer acceptability of business plan proposals.

Stagecoach Rail, UK**South East Franchise Bid Stated Preference Research**

Led the design, analysis and reporting components of a stated preference project to explore passengers' preferences for various train service features. The research was used to support the company's bid for the South East rail franchise.

Ministry of Transport and Communications, Oman**National Spatial Strategy**

Led the design, analysis and reporting components of a stated preference research study exploring the value of travel time savings amongst car users, the potential demand for new public transport modes, and the potential demand for toll roads in Oman.

Welsh Water, UK**Revealed Preference Valuation Research**

Led a study to derive valuations of river water quality and bathing water quality improvements based on an analysis of visitor numbers to sites across Wales.

First Group, UK**West Coast Franchise Bid Stated Preference Research**

Led the design, analysis and reporting components of a stated preference project to explore passengers' preferences for various train service features. The research was used to support the company's bid for the West Coast rail franchise.

Wessex Water, Bristol Water, Welsh Water, Southern Water, South East Water, Affinity Water, UK**PR19 Willingness to Pay Research**

Led the design, analysis and reporting components of PR19 willingness to pay research programmes for several UK water companies. The research explored customers' priorities between various service areas, and their willingness to pay for improvements.

Water UK**Storm Water Overflows, Benefits Valuation Framework**

Expert economics advisor to the project team on cost-benefit analysis and benefits valuation. The team included MWH, Ch2M and Ecofutures. The project formed part of the 21st Century Drainage programme.

Welsh Water, and South East Water, UK**Water Resources Management Plan Stated Preference Research**

Led the design, analysis and reporting components of stated preference research studies relating to water resources management plan options for two UK water companies at PR19.

Welsh Water, UK**Value Transfer Research**

Led a study to derive valuations from published literature for a selection of service areas for PR19.

Scottish Water, UK**Customer Priorities Stated Preference Research**

Led the design, analysis and reporting components of a stated preference research study exploring customers' perceived impacts due to different types of service issue. The results were used for the purposes of prioritising improvements between various service areas for SRC21.

WPD, UKPN and National Grid, UK**Stated Preference Valuation of Energy Service Attributes**

Led the design, analysis and reporting components of a stated preference project for three UK energy companies. The study was focussed on obtaining measures of customer willingness to pay for various service attributes for use within business plans.

Oxford University, UK**Home Delivery Retail Stated Preference Research**

Expert advisor on the design of a stated preference research study to explore shoppers' preferences with regard to home delivery vs in-store shopping experiences and costs.

Bupa, UK**Price Elasticity Research**

Led the stated preference design, analysis and reporting components of a study exploring the demand for private health insurance in the UK.

Transport for London, UK**Multi-Modal Willingness to Pay Research**

Led the stated preference design, analysis and reporting components of a study exploring the relative importance of a large number of journey-related attributes, and people's willingness to pay for improvements. Attributes included relate to bus, tube, car, cycle and walking modes.

TransUrban, Australia**Price Elasticity Research**

Led the stated preference design, analysis and reporting components of a study exploring the demand for TransUrban assets, which include toll roads and bridges, in the Brisbane area.

Environment Agency, UK**Economic Value of Angling**

Currently conducting a joint stated preference-revealed preference study to explore the value to anglers in England of marginal improvements to angling sites. The first survey, which has already been completed, involved surveying anglers about the places they went fishing and their expenditures over the past year. The second survey, currently underway, involves asking anglers to complete two SP exercises to explore their preferences for different site attributes. The intention is that the results from these two surveys will be combined to yield a set of joint SP-RP estimates of values for marginal improvements in angling sites.

Scottish Water, UK**Meta-analysis of PR14/SRC15 Willingness to Pay Results**

Led an econometric modelling study to explore the sources of variation in the willingness to pay results reported by water companies for identical, or similar, service measures at the 2014/5 water price reviews.

London School of Economics, UK**Decision Rules Research**

Collaborated on an academic study involving a stated preference survey to explore households' preferences amongst different options for how decisions could be made by a public body. The research was undertaken in the context of flood control investment in Houston, Texas, and the alternative decision rules tested included the cost-benefit analysis / Kaldor-Hicks rule, majority rule, and a priority-to-the-poor rule.

Ministry of Transportation, Turkey**Transportation Masterplan**

Led the design, analysis and reporting components of a stated preference research study exploring the value of travel time savings across various travel modes.

Ministry of Transport and Public Infrastructure, Malawi**Transportation Masterplan**

Led the design, analysis and reporting components of a stated preference research study exploring the value of travel time savings across various travel modes.

Passenger Demand Forecasting Council, UK**Fares Simplification Research**

Led the design, analysis and reporting components of a stated preference research study exploring the potential impact of fares simplifications on demand for rail travel and ticket type choice.

First Buses, UK**Price Elasticity Research**

Led the design, analysis and reporting components of a stated preference project to explore passengers' price elasticity of demand and preferences between various ticketing options.

Suffolk County Council, UK
Sizewell C Impact Assessment

Led the design, analysis and reporting components of a stated preference research study exploring.....

First Group, UK
South West Trains Franchise Bid Stated Preference Research

Led the design, analysis and reporting components of a stated preference project to explore passengers' preferences for various train service features. The research was used to support the company's bid for the South West rail franchise.

Royal Mail, UK
Parcels Market Stated Preference Research

Led the design, analysis and reporting components of a stated preference research study exploring the characteristics of market demand for parcels in the UK. The output from the study included a simulator model to predict the impact on demand and revenues due to bespoke scenarios inputted by the user.

DEFRA, UK
Peer Review of Updated Benefits Estimates for the Thames Tideway Tunnel

Reviewed a study which updated the environmental benefits estimates attributable to the prospective Thames Tideway Tunnel.

University of Cambridge, UK
Smart Energy Stated Preference Research

Led the design component of a stated preference project to explore households' preferences with respect to smart energy technology and service contracts. The research was used within a broader academic study into smart energy issues.

Virgin Trains, UK
Car Competition Stated Preference Research

Led the design, analysis and reporting components of a stated preference project to explore the impact of falling car fuel prices on the demand for rail, and other aspects related to the competitive interaction between car and rail. The research was used in conjunction with a parallel revealed preference study to help Virgin Trains understand current trends and make predictions with respect to rail demand going forward.

Highways England, UK
Road User Stated Preference Research

Led the design and analysis components of a stated preference research study exploring road users' priorities in relation to various types of improvement to the roads, and to Highways England's services. The research was used to support Highways England's strategy development.

University College London, UK**Impacts of Community Severance Stated Preference Research**

Led the design component of a stated preference project to explore the impact on local residents of road widening, and their preferences for alternative types of pedestrian crossing. The research was used within a broader academic study into community severance impacts.

First Group, UK**East Anglia Franchise Bid Stated Preference Research**

Led the design, analysis and reporting components of a stated preference project to explore passengers' preferences for various train service features. The research was used to support the company's bid for the East Anglia rail franchise.

WPD and National Grid, UK**Stated Preference Valuation of Energy Service Attributes**

Led the design, analysis and reporting components of a stated preference project for two UK energy companies. The study was focussed on obtaining measures of customer willingness to pay for various service attributes for use within business plans.

First Group, UK**Trans Pennine Express Franchise Bid Stated Preference Research**

Led the design, analysis and reporting components of a stated preference project to explore passengers' preferences for various train service features. The research was used to support the company's successful bid for the Trans Pennine Express rail franchise.

TSB, UK**Added Value Accounts Market Research**

Led the design, analysis and reporting components of a stated preference project to explore customers' preferences with respect to various bank account features. Developed a simulator model to predict the impact on market share and revenue of introducing a suite of new accounts as a function of the accounts' features and prices.

UK Hydrographics Office, UK**Electronic Navigational Charts Market Research**

Led the design, analysis and reporting components of a stated preference project to explore the preferences and choices of customers in the worldwide market for electronic navigational charts. Developed a simulator model to predict the impact on market share and revenue in response to various hypothetical own-company and competitor supplier actions.

European Bank for Reconstruction and Development, UK**Appraisal of Infrastructure Investment Proposals**

Advised on the design and analysis of a stated preference survey to appraise the viability of water and wastewater infrastructure investment proposals in the Kyrgyz Republic.

Transport for London, UK**Stated Preference Study to Appraise the Impact of an Ultra Low Emissions Zone in London**

Led the design and analysis of an SP study on behalf of Transport for London to forecast the effect of introducing an ultra-low emissions zone, and corresponding charges for non-

compliance, on travel behaviour and revenue. The output included a spreadsheet model allowing TfL to obtain quantitative predictions in response to varying the level of the charge and its timing, by vehicle type.

Intercity Railways, UK

East Coast Franchise Bid Stated Preference Research

Led the design and analysis of an SP study to explore passengers' preferences with respect to a wide range of service attributes, including travel time-shifting and flexibility, booking options, station facilities and on-board facilities. The research was used to support the company's ultimately successful bid for the East Coast rail franchise

A Club of 15 UK Water Companies

Review of PR14 Willingness to Pay Estimates

Conducted a review and comparison of the results obtained by water companies' willingness to pay research studies for the 2014 industry price review.

Scottish Water, South West Water, Northumbrian Water, Essex & Suffolk Water, Welsh Water, Southern Water, South East Water and Sutton & East Surrey Water, UK

Stated Preference Valuation of Water and Sewerage Service Attributes

Led the design, analysis and reporting components of multiple stated preference projects for UK water companies. The studies were all focussed on valuing improvements to water and sewerage service levels, to support business optimisation modelling and planning in advance of the 2014 industry price review.

UK Water Industry Research

Carrying out Willingness to Pay Surveys

Advised on issues relating to the development of a common framework for the design and conduct of willingness to pay surveys in the context of valuing the benefits of water company investment programmes. This included identifying and defining the relevant service measures, attributes and levels plus the wider survey features that may affect the reliability and robustness of WTP results; identifying aspects of service or environmental improvement which may be better valued in ways other than by such surveys, and providing guidance on valuation for such cases.

Competition Commission, UK

Peer Review of Stated Preference Survey Design

Reviewed a stated preference survey questionnaire for use in the Payment Protection Insurance inquiry.

Infraco, Uganda

Appraisal of an Infrastructure Investment Proposal

Advised on the design and analysis of a stated preference survey to appraise the viability of water, electricity and transport infrastructure investment proposals in rural Uganda.

Ministère de l'Ecologie, de l'Energie, du Développement Durable et de l'Aménagement du Territoire (MEEDDAT), France

An Econometric Model of Household Vehicle Choice

Developed a model of household vehicle choice in France. The model was estimated using discrete choice econometric methods on data from a large sample of individual households. The main purpose of the model was to predict the effect of introducing a new vehicle excise tax favouring the least-polluting vehicles.

Postcomm, UK

The Social Value of the Post Office

Designed and analysed a UK-wide survey to quantify the social value of the post office network to UK households and businesses. Choice experiments and contingent valuation methods were employed to elicit values.

Environment Agency, UK

Further Analysis of the Benefits of the Water Framework Directive to England and Wales

Developed extensions to the spreadsheet model created for CRP Project 4b/c (see below), and conducted analyses of the benefits of the Water Framework Directive under specified scenarios. Also provided training in the use of the models and in the interpretation of the results. The models were used in the development of the river basin management plans for the first Water Framework Directive planning period (2009-2015).

Defra (CRP Project 4d), UK

Public Preferences for Water Framework Directive Outcomes [Prioritisation]

Co-managed a study to design and analyse a national household survey to elicit household preferences between alternative types of improvement to the water environment. The results are being used to help determine the content of the first set of river basin management plans required by the EU Water Framework Directive.

Defra (CRP Project 4b/c), UK

Valuing the Benefits of the Water Framework Directive to England and Wales

Managed a major government study to design a survey instrument capable of valuing the benefits of the EU Water Framework Directive to households in England and Wales, and then analyse the results using a range of econometric techniques. The project involved focus group research, stakeholder interviews and a literature review to inform the survey design. The main outputs were a detailed report, and a spreadsheet model valuing the benefits of specified implementations of the Water Framework Directive.

Anglian Water, UK

Peer Review of Benefits Appraisal for PR09 CBA

Contributed to a peer review of ICS's evaluation of the benefits of Anglian Water's investment programme for PR09.

Anglian Water, Thames Water and South West Water, UK

Stated Preference Valuation of Water and Sewerage Service Attributes

In five separate projects, advised on design and analysis issues relating to stated preference surveys for valuing improvements to water and sewerage service levels, for three UK water and

sewerage companies. The results of the surveys were to be used for business optimisation modelling and in regulatory submissions for the 2009 price review.

A Major International Pharmaceutical Company

Stated Preference Analysis of Consumer Preferences for Drug Attributes

Advised on analysis and interpretation of results from choice modelling study of consumer preferences for drug attributes.

Thames Water, UK

Drought Order Economic Impact Assessment

Managed a project assessing the costs and benefits to residents and businesses in the London and Thames Valley areas of a proposed statutory drought order, which would limit the use of water for non-essential uses.

Defra (CRP Project 1c), UK

Screening Economic Mechanisms for Inclusion in Programmes of Measures for the Water Framework Directive

Managed a project evaluating which pricing policies, cost recovery mechanisms and economic instruments could potentially play a role in the achievement of the objectives of the Water Framework Directive.

Thames Water, UK

Valuing the Economic and Social Cost of Drought Water Use Restrictions

Managed a project involving a stated preference study of the costs of drought water use restrictions to customers. Study included qualitative and quantitative research, design, implementation and analysis.

Water UK

Long-Term Planning in the UK Water Sector

Co-wrote a scoping note on issues concerning long-term planning for policy-makers, regulators and water companies.

Thames Water, UK

The Economics of Wastewater Supply-Demand Planning

Managed a project involving the design of a cost-benefit framework for planning investments in the wastewater service.

Environment Agency, UK

Time-Limited Licences

Examined the economic implications of the Environment Agency's intended approach to the management of abstraction licences.

Department for Regional Development, Northern Ireland

Reform of Northern Ireland Water Service

Undertook research contributing to a wide-scale analysis of the options for institutional reform of the Northern Ireland water sector. The project comprised: examination of restructuring of the national water utility and development of options for private sector participation;

forecasting anticipated efficiency improvements; constructing financial valuation model; and, asset valuation.

A European Water Service Provider

Activity-Based Cost Modelling

Managed a project involving the construction of a model for the fair allocation of all the costs of water and sewerage services across household, industry and commercial customers for the determination of bills.

Eurocontrol

Cost Benchmarking Analysis

Managed a project involving an econometric stochastic frontier analysis of European air navigation service providers' costs.

Lloyd's Pharmacies, UK

Forecasting Prescriber Volumes

Developed an econometric model with which to forecast prescription volumes for different classes of drug within primary care trust areas. The model was based on panel data analysis of population demographics and historic trends.

Network Rail – Office of Rail Regulation, UK

Enhancement Framework in Regulated Utilities

Wrote a chapter describing some key features of the England and Wales, and Scottish, water and sewerage industries in respect of the way that risks in capital enhancement projects are allocated between companies, customers and third parties. The full report drew comparisons between the electricity, gas, water and sewerage, airports and rail industries.

Essential Services Commission, Australia

Note on Infrastructure Charges

Wrote a note on the scope and structure of the infrastructure charge in the England and Wales water and sewerage industry. Included a discussion of the issues surrounding the charge since it was introduced at privatisation and the resulting reforms that took place.

Lloyd's Pharmacies, UK

Estimating Determinants of Prescription Volumes

Advised on panel data econometric issues for a project analysing the effects of local area characteristics on volumes of different types of drugs prescribed by GPs.

Office of the Deputy Prime Minister, UK

Review of Seasonal Adjustments

Managed a project involving the analysis of benefit claimant data at Local Authority level to identify whether patterns of seasonality differ in predictable ways across Local Authorities. We used the X12-ARIMA filter method and panel data regression methods to analyse the seasonal components of the multiple time-series.

Northumbrian Water, UK**Cost of Capital Analysis**

Estimated the cost of equity for UK water companies using Dividend Growth Models.

Thames Water, UK**Review of a Reservoir Development Proposal**

Jointly led a workshop to review all aspects of a proposal to develop a major reservoir. Issues covered included the statement of needs, estimation of impacts and monetary valuation of these, estimation of scheme and system costs, optimisation of supply-demand plans considering all potential sources of yield and demand management possibilities, key elements of the land-use and regulatory cases required.

Scottish Water**Comparative Efficiency Analysis**

Estimated the relative efficiency levels of UK water companies' operating expenditures using panel data regression models.

Scottish Water**Forecasting National Construction Output Prices**

Derived medium-term econometric projections for the national Construction Output Price Index using an error correction model.

Anglian Water, UK**Macroeconomic Forecasts and Scenarios**

Developed internally consistent and credible forecast scenarios for a number of economic variables including GDP, RPI, interest rates, construction prices and industrial water demand.

Water UK (UK Water Industry Trade Body)**General Efficiency Analysis**

Produced medium-term forecasts for opex and capex input prices as an input into an analysis of the scope for efficiency in UK water and sewerage industry over the coming price review period.

Scottish Water**Financial Risk Model**

Identified and quantified Scottish Water's financial risk exposures as an input into the development of a model to take account of the impact of risk exposures on the company's financial position.

Scottish Water**Demand Forecasting**

Advised Scottish Water on best practice methods for water demand estimation and forecasting.

A Group of UK Water Companies

Financial Risk Model

Assisted with the development of a financial risk model to take account of water company risk exposures and the resulting impact on financial indicators through the use of Monte Carlo analysis. The work also involved identifying and quantifying the risks facing water companies ahead of the periodic review.

Water UK

Estimating the Cost of Capital for UK Water Companies

Analysed recent evidence on the cost of capital for UK water companies using CAPM and DGM methodologies.

Strategic Rail Authority, UK

Estimating Long-Term Fare Elasticities of Rail Demand

Constructed models of demand for four segments of the UK rail passenger market. Estimated cointegration models using panel data, with fixed effects estimators and with an error correction mechanism.

UK Water Industry Research

The Impact of Household Metering on Consumption, Further Analysis

Managed a project involving the estimation of the effects of metering on household water consumption in various weather conditions and over time using a panel dataset. Also, using company information on metering promotions, estimated the impact of publicity on the propensity of households to opt to pay for water and sewerage services on a measured basis.

Opta, Netherlands

Estimating the Cost of Capital for the Telecommunications Industry

Estimated the cost of capital for termination and origination fixed line telecommunication services.

Water UK

Estimating the Cost of Capital for UK Water Companies

Analysed evidence on the CAPM beta for UK water companies as part of NERA's report for Water UK for the 2004 periodic review.

Southern Water, UK

Review of Tariffs for Bulk Supply and Network Access

Reviewed estimation methods and issues with respect to the client's proposals to base their bulk supply charges on Long Run Marginal Cost and their network access charges on the Efficient Component Pricing Rule.

Yorkshire Water and United Utilities, UK

The Impact of Household Metering on Consumption

Estimated the effects of metering on household water consumption using panel datasets. Also estimated a model of the propensity of households to opt to pay for water and sewerage services on a measured basis.

Northumbrian Water, UK**Forecasting Industrial Water Demand**

Quantitatively analysed a panel dataset to derive regional and sectoral forecasts for non-residential water use. Estimated dynamic demand model using the Arrelano-Bond GMM estimator.

Northumbrian Water, UK**Forecasting National Construction Output Prices**

Derived medium-term projections for the national Construction Output Price Index using macroeconomic and construction industry data sources.

UK Water Industry Research**The Impact of Household Metering on Consumption**

Estimated the effects of metering on household water consumption using panel datasets with a random effects estimator. Also developed and estimated a complementary log-log discrete choice model of the propensity of households to opt to pay for water and sewerage services on a measured basis.

Western Power Distribution, UK**Cost of Capital Analysis**

Quantitatively assessed the reliability of recent estimates of the CAPM Beta for UK utilities.